WIRE
& WIRE PRODUCTS

In This Issue:

Hardening of Iron Wire
By H. Altpeter

Industrial Housekeeping
By George A. Paff

Influence of Cold Working on the Physical Properties of Wire
By A. J. Michel

Digest of Current Literature on Wire

News

January 1927

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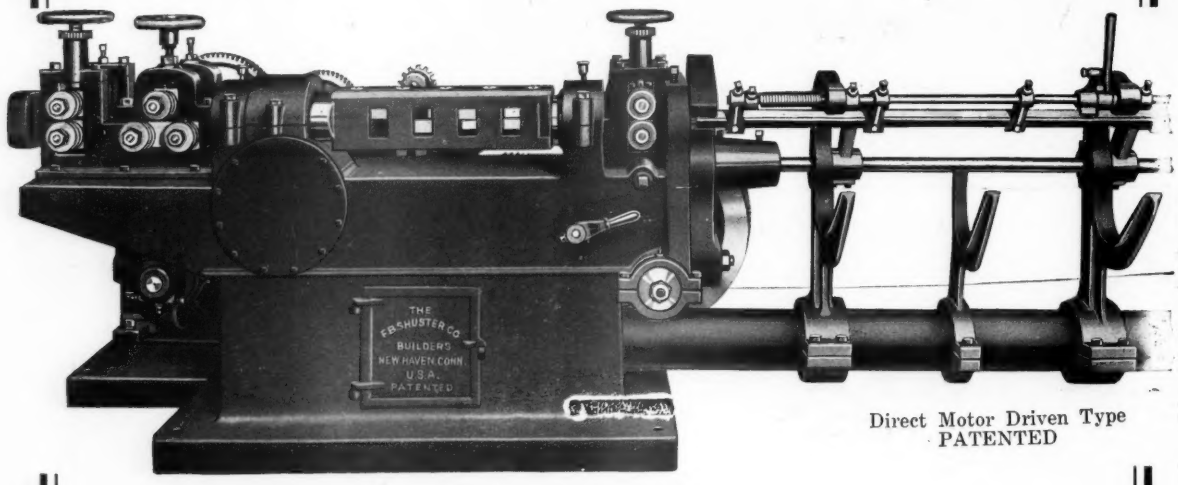

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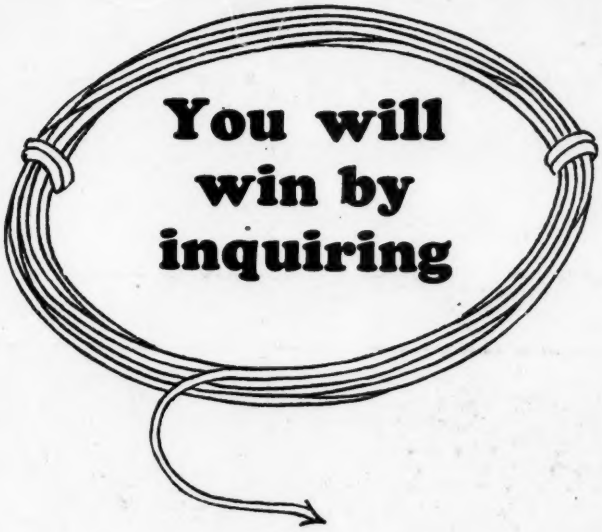

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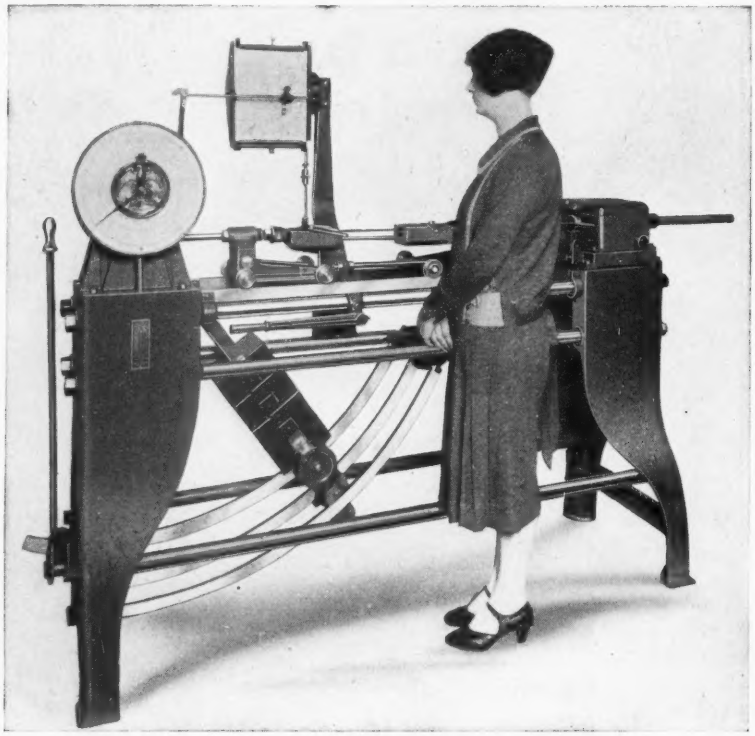

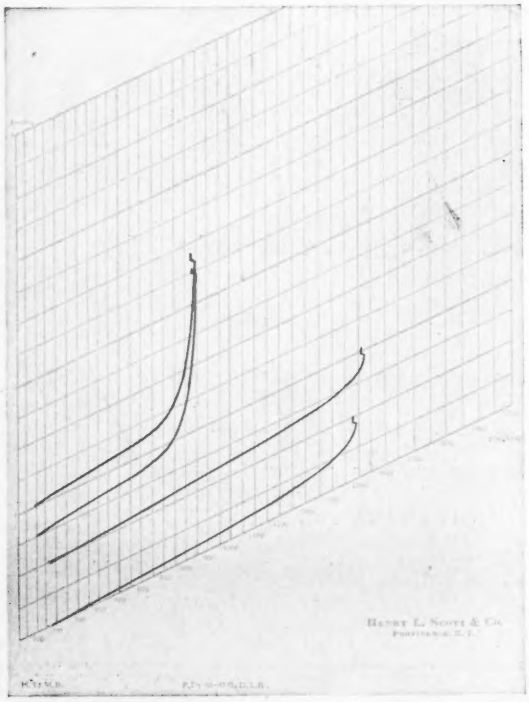

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THE New Year finds us—as ever—filled with enthusiasm for the rising career of *Wire & Wire Products*. Our readers we feel sure will turn over the new leaves of the coming issues with the same interest that attended their past reading. And 1927 promises an even larger variety of subject matter attended by a very material increase in circulation and advertising.

* * *

In keeping with our former policy we shall continue our careful survey of European literature on wire and publish such translations as are of interest to the American industry.

* * *

Judging by inquiries which we receive daily our Patent Review and Digest of Current Literature departments are doing valuable service. More attention will be paid in the future to Canadian, English, French and German patents relating to the wire industry.

* * *

Unfortunately we were obliged to omit both these departments in the present issue. It was necessary to yield this valuable space to important contributions of the month. Due effort will be made to compensate for this ommission next month.

* * *

Mr. Paff, Associate Editor, and a well known contributor, of *Wire and Wire Products*, has written for this issue the article on "Industrial Housekeeping" which may serve as a basis for the New Year's resolutions of interested superintendents and plant managers.

* * *

Far be it from us to moralize on New Year's resolutions even in an industrial way,—but a word of exhortation is necessary in these days when a "new leaf" is too likely to be a loose leaf.

The Publishers.

WIRE & WIRE PRODUCTS

A monthly publication devoted to wire drawing and wire forming

Vol. 2 January, 1927 No. 1

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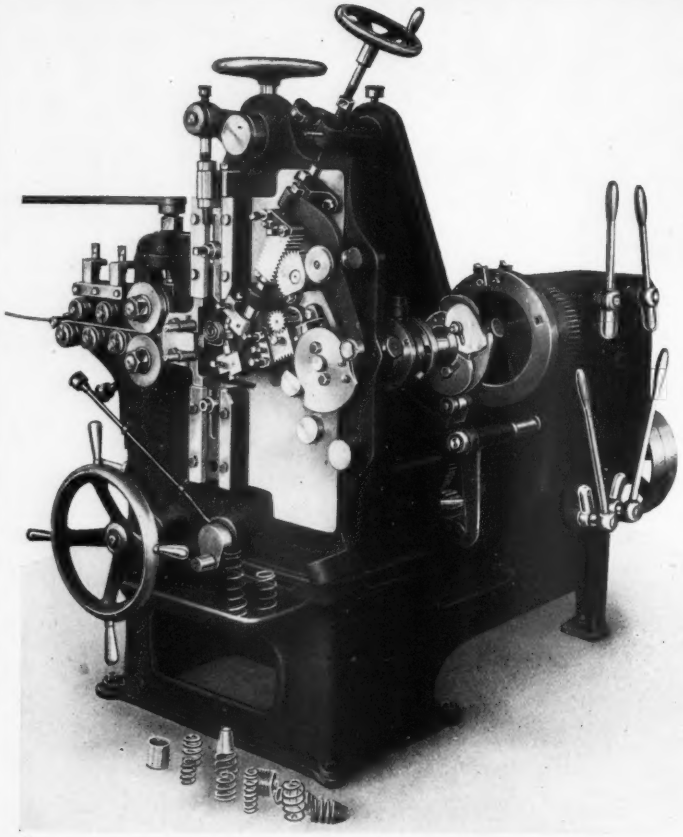

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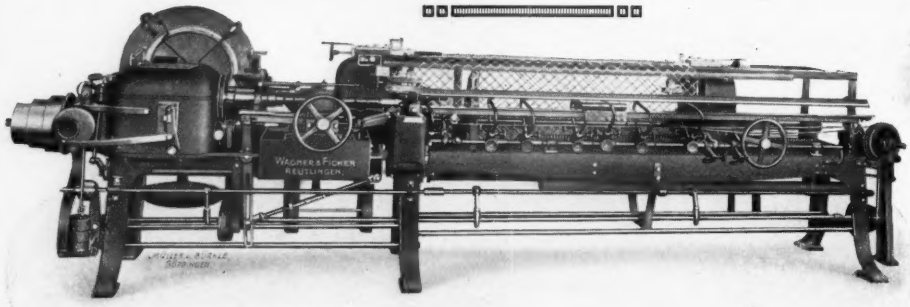

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WIRE
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Vol. 2 JANUARY, 1927 No. I

Hardening of Iron Wire

Discussion of German practice in heating, quenching and tempering of wire

By H. Altpeter
Translated from Stahl & Eisen

IN order to harden it, the wire is heated in the region of 800-900°, thick wire in a drawn oven, as is described in the specifications of patented processes. With thin wires, however, the heating best takes place over illuminating gas flames, and not in a muffle. Quenching should follow soon after the highest temperature is reached in order to avoid the appearance of over-heating, and for this purpose, in both cases, immediately on leaving the heater, the wire is passed through a trough in which cold oil, generally train oil, flows continuously. By this means, the wire is rapidly cooled off. The hot oil runs away and is pumped into a large tank, from where it is once more led to the tempering trough.

As wire quenched in this way becomes too hard for many purposes, it is generally somewhat softened by reheating. With this end in view, after passing through the oil bath, the wire passes first through a wiping apparatus provided with rubber or the like, to dry off any adhering oil. Next it is passed over a hot plate, which when necessary ,is covered with sand. After that it is spooled.

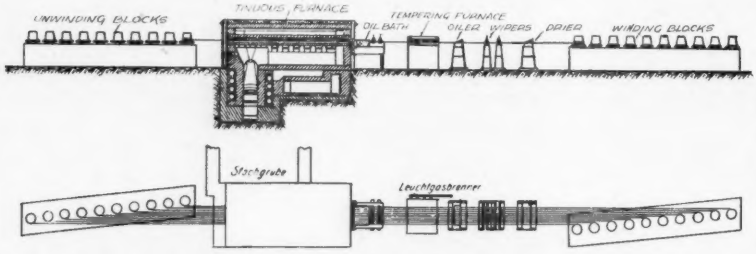
Change in Strength

As we have already mentioned in connection with various problems, Tinsley has measured the effect of different tempering temperatures. For example, he has been able to establish that for a change in tempering temperature from 250 to 600°, the strength of a hardened wire fell from 250 gr. per square mm. to 100 gr. per sq. mm., while the drop in strength amounted to barely 140 gr. per sq. mm. between 250° and 325°, and between 550° and 600°, only to about 10 gr. per sq. mm.

At a white heat, at which point the wire must be guarded during annealing from all access of air, a so-called white hardness results, a condition, particularly in use for the manufacture of a special kind of fine wire and for needle wire. Such a hardening layout is reproduced in Fig. 1.

It consists of a heating oven, which is from 2 to 4 meters long, according to the thickness of the wire. In it the wire passes through iron pipes, placed in a shallow muffle and for the protection against quick burning out, the latter are covered with asbestos cord and refractory materials. At the entrance for the wires, these tubes are provided with asbestos stoppers through which the wires pass. Where the wire leaves, is a narrow cast iron chamber about 20 mm across which is made as airtight as possible. In this chamber, rape seed oil flows, in a direction counter to the wires, from as many small holes in the wall of the adjoining oil container, as there are wires drawn through the tubes. From the narrow chamber, the oil can flow away continuously through a syphon to the large container in which the above-mentioned oil tank is placed. This incoming oil is pumped from this large tank and taken again to another large adjacent reservoir, from which the container is supplied. In the top of the wall of the latter facing the oven, are cut holes or rather slots, equal in number to the wires. These slots are of such a depth that they stand at about the same height as the orifices in the airtight chamber, so that without any twisting or bending whatsoever, the wires can pass through the oil bath. This is necessary, as in the latter, the wires become glass hard and

brittle, and cannot then stand any bending. After passing through the oil tank, the wires proceed through two wipers in the large reservoir behind the oil tank, where the adhering oil is cleared off. The first wiper has two super-posed soft rubber plates, the wire passing between. In the second, felt sheets take the place of the rubber. In order to remove the hardness



Layout of a German plant for hardening fine wire. The system is continuous.

and brittleness acquired in the oil bath, the wires must then pass through an annealer, and usually, this consists of a pan, filled with lead, in the top of the walls of which, wrought iron tubes are fastened, so that the latter are surrounded by molten lead. In this way, the wires become annealed after passing through the tubes. Here also, the tubes, projecting rather far out of the oven, are sealed against entry by air by means of a rubber stopper, so as to prevent oxidation of the wires.

As the wires have become quite dry in the annealing oven, it is essential to protect them against oxidation in the moisture of the air, by means of a dressing of fat. With this end in view, the wires are passed through an oiler, that is, they pass over a narrow trough filled with refined bone oil, and provided with cotton waste which has absorbed so much oil that it can constantly provide the wires with a fine coating of oil. Excess of oil is removed by means of felt wipers, and a further protection against oxidation is provided by passing through pumice or talc.

For both cast iron and steel wires, the finishing processes comprise, annealing, tempering, lacquering, coating with metals, as galvanizing, tinning, coppering, and lastly polishing.

The annealing of steel wire proceeds as in the case of cast iron wire, but particular care is necessary in cooling off and removing the wire from the heating chamber.

For many purposes a nice temper or tarnish color is desirable for wire goods, an effect obtained by heating the entire coil of wire in a special oven, or by passing it through one of the tempering contrivances already described. The temperatures between 200 and 400° which determine the colors, are for instance, given in the "Hutte" (Manual for Ironmolders) as:

220°	light yellow
230	pure yellow
245	dark yellow
255	bluish yellow
265	reddish brown
275	purplish red
285	violet
295	cornflower blue
310	light blue
325	sea green

Lacquering also belongs to the finishing processes. It is carried out by the use of warm or cold, quick drying lacquers, through which the wires are passed. As already mentioned, for polished wires, particularly for use as piano wires, wet drawn wires are used. We must differentiate between scouring to clean the wire and polishing to produce a high polish.

All operations are carried out experimentally in succession. The wires first pass through press-blocks, provided with felt or some similar material, and then proceed into a box containing a mixture of emery and oil. Next they are brought between pairs of wooden press-blocks, provided with concentric spindles; or they are passed through a series of bands which form a long helix round the wires and can be stretched by rotating a spool. After passing through the press, the residue of oil and emery is removed between wool and felt presses, and the finish applied in a similar press with a little lime.

The finished wires are very sensitive to perspiration spots, and so gloves should be worn when tying, untying and packing. They should also be sprinkled with pumice to protect them from oxidation.

As to defects and shortcomings in the manufacture of steel wire, what has been said for cast iron wire can also apply here. As in the case of the former, the effects of annealing, and pickling are particularly far reaching, and the careless carrying out of these operations leads to defects which cannot generally be corrected.

In the presence of troostite and sorbite, steel acquires its greatest solubility in acids. It is for this reason that steel products rich in carbon ,such as plough steel wire, high tensile wire rope, piano wire and so forth, are exceedingly sensitive to all kinds of weak acids.

With steel wire it is especially important to maintain correct annealing temperatures, as an excessive temperature readily leads to carburizing at the surface as well as grain growth, if not burning. In the case of needle wire and similar materials, which easily become unserviceable, carburizing at the surface develops with time, so that perfect hardening and polishing are out of the question.

Respecting the change of physical properties with the drawing of steel wire, such as elasticity, electrical conductivity, magnetic susceptibility, and so on, reference should be made to the work of Goerens, Seyrisch and others.

Industrial Housekeeping

Observations of a plant superintendent on an important aspect of management

By Geo. A. Paff

Superintendent Rod and Wire Depts., Wheeling Steel Corp.

CLOSELY allied with fire prevention and the safety first movement, and closer still with efficient management, is the science of plant housekeeping.

If I were a credit manager, charged with the responsibility of steering my employer's affairs clear of the treacherous shoals of poor credits, I would, of course, want to know all that Dunn and Bradstreet had to say regarding each individual account.

More than that, and of equal importance, I would want to know whether my customer's rating as a housekeeper is AAA-1 or of the M-4 variety. I would leave nothing undone to train myself to distinguish good from bad housekeeping.

If I were a member of a bond house, and had under advisement a bond isues for a manufacturing concern, I would want to know, in addition to their assets and liabilities, something about their facilities for production, their source of raw material, the outlet for their finished products, their freedom from prohibitive competition, the value of their properties, the history of their personnel, their standard of quality, their fire record, and their average profits over a period of years. Last, but by no means least, I would want to know a very great deal about their standard of plant housekeeping, before I would be willing to sponsor the bonds of any concern with which I might be called upon so to deal.

In the treatment of this subject we confess a "fear and trembling" for we are ever mindful of the hazard of tossing missiles of advice and censure to others, while, even as we write, we may be found abiding in the proverbial glass house.

In brief, there is not a single item pertaining to plant supervision, wherein we are more liable to be caught "napping". Nor is there another feature of industrial management which reflects more directly upon the managerial staff than the housekeeping conditions which prevail not for today or tomorrow but for every day in the year.

Good housekeeping is a virtue which almost invariably must come from the top down. It rarely, if ever, comes from the bottom up.

It must first become an obsession with the very head of the institution before the "contagion" can be expected to spread to the ranks.

The "honor system" in the matter of plant housekeeping is never worthy of serious consideration until after a period of years it has from habit and persistent effort, become infused into the very blood of the entire organization.

In February issue of
Wire & Wire Products:
"Accident Prevention in
Wire Mills"
By M. A. Hall

Each line of manufacture has its own peculiar problems in this regard, for there is always the legitimate manufacturing debris which must be considered, and of which disposition is currently made.

It is not that phase of the problem with which I propose to deal in this article. I have more in mind the unkempt corners, the unsightly conditions, the ever present soap box locker, the accumulation beneath and above the work bench, the discarded lunch paper, the emptied tobacco pouch, the worn out gloves, the obsolete, broken and discarded machine parts, the abandoned overalls, the old rubber shoes, the oily waste and the thousand and one things which are cast promiscously about the plant and permitted to accumulate throughout the days and weeks and months, until all semblance of respect for the property and product has faded. It will continue to fade, just so long as the management permits these conditions to prevail.

When the subject and nature of this article first suggested itself, I conceived the idea of classifying and grading the various types of housekeepers hereinafter described. Upon second thought, it was concluded that there is, after all, no middle ground to be considered. We are either in the A or the Z class.

First; we have the type of housekeeper who from time to time issues the threadbare instructions to "clean up boys, we are expecting company tomorrow". How often have most of us heard that very expression. This type of housekeeping is absolutely without merit or lasting results, and will always be found in the Z class.

Furthermore the average visitor does not even require the trained eye of an expert to detect that the hurried and superficial clean up was "framed" for his benefit.

Next, there is the type of

housekeeper who periodically or spasmodically conducts an intensive campaign of housecleaning. This type is entitled to something better than grade Z, but I will adhere to my promise not to consider any intermediate standing in our classification.

A third and very prevalent group is represented by those who indulge in "brain storms" in dealing with their organizations or with individual employees on this subject. The only permanent result from these "fits of temper" is a dangerous increase in blood pressure.

There is another type of housekeeper who depends entirely on the paint and whitewash brush. As a first aid, this is a step in the right direction. Good housekeeping may, and frequently does begin with these embellishments, but it should never be permitted to end there.

I recently visited a manufacturing plant where great extremes in this regard were in evidence. Every machine, every roll housing and every piece of equipment had been treated to a coat of paint of an attractive hue. The brick work of every furnace was whitened and all the bindings and doors of the heating furnaces had been treated with aluminum paint. The interior of the plant had been brightened by great expanses of mill white. I am forced to say however that not for many days have I seen a plant with more filthy corners and unkempt conditions than were observed in this very institution. Paint, while always helpful, can never be made to cover the multitude of sins in plant housekeeping. Better by far to leave the paint barrels unopened than to bring about a condition which causes us to exclaim, "Consistency thou art a jewel, but consistency where art thou?"

Next we have the type of manager who insists on maintaining a sort of a "mechanical morgue" where all sorts of obsolete machinery and machine parts which have long since served their usefulness are permitted to accumulate and repose. Some years ago I was subordinated to a manager who personally scrutinized every car of scrap that came to the Open Hearth Department. His policy was to select and to store such machinery parts as would appeal to his fancy. Without any definite object his hope was to use the said parts for "something, somewhere, and at some time".

The scrap value of these nondescript graveyards is always more than ample to offset the purchase price of a properly designed piece of equipment for a specific purpose when needed.

And then there is the type of superintendent who at the conference table or from his office chair only, deals with this housekeeping matter and who talks only in generalities in his endeavor to raise the standard of plant cleanliness. This is right and proper as far as it goes, but as a rule it rarely goes far enough. Unheralded inspections of the plant by the superintendent and his entire staff are far more effective. No self-respecting foreman takes kindly to the unexpected exposure of a "bad corner", and it takes but one or two demonstrations of this kind to turn the trick.

There are other types of housekeepers that could be discussed but space will not permit. As a final specimen let us consider our "hard-boiled" friends of the old school whose only weapon of defense is the old familiar and oft-repeated question, "What's the use?" To such we offer sympathy rather than censure. Of all the types this is the most hopeless. Were it not for the fact that a reply should rightfully form a part of this article, we would gladly permit the interrogation to go unanswered.

Clean corners and ample provision for refuse mark Mr. Paffs own plants.

What, after all, is to be gained by this modern tendency to improve the standard of plant housekeeping?

We are here confronted with the problem of condensing into a few simple lines an answer that could well be made to fill a volume of no mean proportions.

A greater regard for the property, a superior class of labor, more production, a higher grade product, less waste of material, lower costs, a better satisfied organization, a more wholesome respect for superiors, less danger of fire, and an improved standard of safe-

(*Continued on page 32*)

The Influence of Cold Working on the Physical Properties of Wire

By A. J. Michel
Metallurgical Engineer

GENERALLY speaking, cold working is mechanical work carried out while the temperature of the metal is below the annealing temperature. In the specific case of cold working of iron and steel, it is mechanical work carried out while the temperature of the material is below the critical range. Below its critical range, steel is an aggregation of pearlite and ferrite, or pearlite and cementite, as the case may be. While working of wire at a temperature above its annealing temperature or its critical range will only retard recrystallization of the slowly cooling metal, thus opposing grain growth and imparting a finer grain to the material, this is not so in the case of cold working effected at a temperature below the critical range, or below the annealing temperature. No tendency to recrystallization exists in metal if it is thus cold worked, because one of the factors favoring crystallization, i. e., heat, is absent. And since the action of any external force upon the particles or grains of cold material, results in the deformaion and changing of their form, this modification of their shape cannot be undone; the grains or crystals are said to be distorted. tortion will be slight if cold working occurred while the materiail was near its critical range, whereas it will be very pronounced if the cold working took place at atmospheric temperature. All metals are greatly hardened and stiffened by deformation below annealing temperature, whether such deformation be effected by cold drawing or any other cold working. This cold working materially increases the tensile strength, the elastic limit and the hardness of the material, whereas it substantially decreases its ductility. The magnetic permeability, the remanence and the density of the product are diminished, while its cohesive force, its electric resistance, its solubility in acids and its tendency to corrosion are

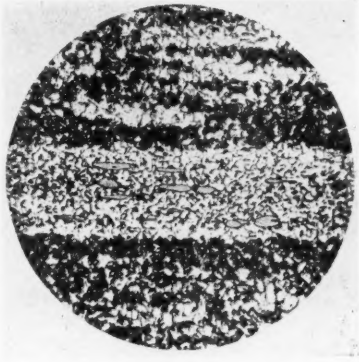


Fig. 1—Cold worked iron wire. Carbon content 0.54%. Magnification x80.

enhanced. Its specific heat does not appear to be affected.

Slip Lines

What now is the reason for these marked changes in the physical properties of cold worked wire? In order to find an answer to this qestion, Rosenhain worked a strip of steel wire in the cold state by distorting it by means of a certain traction exerted at its extremities, in such a way as to allow observation of its polished surface under the miscroscope. He discovered dark lines running in a more or less orderly manner over the magnified crystalline surfaces. Rosenhain called these strange lines slip lines, and the following is the explanation he gave for their appearance: When crystals of a ductile metal are forcibly altered in shape, they adapt themselves to the new configuration imposed upon them by a process of sliding, which occurs on certain of their crystallographic planes. When studied under the microscope the vertical rays which strike the flat surface between the crystals are reflected back directly into the objective and these surfaces consequently appear bright. But slip bands will be dark, because they send no light back into the objective of the microscope. This slipping of parts of the crystals on the one hand and of whole crystals with respect to each other on the other hand is accompanied by another effect. A more or less thin layer of amorphous metal will be formed on each cleavage plane along which the material slips. This layer will act as a sort of lubricant, facilitating slipping. The elasticity of amorphous metal is limited by its yield point, and after the yield point is passed the crystals begin to elongate.

Reduced Plasticity

We have seen that slip is accompanied by a certain disturbance of the crystalline arrangement of the molecules on or near the surface of slip. If the deformation has been slight, the disturbed molecules may be able to rearrange themselves in accordance with the crystalline system by which they are surrounded, and the crystalline character of the metal will then be unaffected by the deformation. When the distortion is severe and if it is intensely localized, the molecular disturbances of the slip surface become larger and permanent layers of amorphous metal are formed on each surface where slip has occurred. Ultimately, as the result of extreme deformation, the metal becomes a mass

of crystalline fragments embedded in relatively thick layers of amorphous metal. Likewise, along the paths of intercrystalline disturbances and ruptures, more or less thick layers of amorphous material are generated, thus considerably adding to the effect produced by the amorphous metal just mentioned. All these changes are accompanied by an increase of hardness of the metal, since amorphous metal, physically speaking, behaves like glass. Simultaneously there is a decrease in density of the metal, since there is a possibility of the metal particles becoming more or less disconnected through the action of pulling. A metal that has been thus hardened by cold working, as before stated, has a much higher yield point and limit of elasticity, and even a higher ultimate tensile strength. All this is easily explained if one considers that the hard and brittle networks and films of amorphous metal surrounding the crystals like a net and penetrating the crystals like a screen, tend to stiffen the whole material somewhat like iron bars stiffen and strengthen reinforced concrete. Thus material which has been worked in the cold offers additional resistance to the commencement of fresh slip, and these facts afford a simple explanation of the apparent hardening of material by plastic deformation. As amorphous layers are formed, the capacity of the crystals to yield by slip is diminished, and the material has been rendered in-

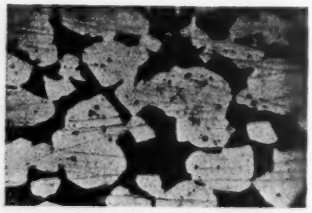


Fig. 2—Brass before cold-working. Magnification x210.

capable of further plastic deformation, being too hard and too brittle. Thus successive deformations diminish the plasticity of metal until it has completely lost this property.

Another influence of cold working of metal wire resides in the fact that the individual crystals not only lose their shape, but are broken into fragments so that their number increases. This is easily observed in the case of soft iron which consists mostly of ferrite crystals. In the case of steels with a higher carbon content, namely the eutectic steels (carbon content 0.85%), the detection of the change of form and the demolition of the constituents is more difficult. In the case of these steels this is of minor importance, since cold working, as in the case of wire drawing, calls mostly for the softer kinds of steel. Due to their low carbon content these steels have an inherently greater plasticity.

Some Typical Examples

Fig. 1 shows a photo-micrograph of cold rolled steel wire of a carbon content of 0.54%, magnified 80 times. The distortion of the white ferrite and dark pearlite grains is easily visible. Elongated inclusions of slag are to be seen in the center area rich in ferrite. The alternate occurrence of these ferrite and pearlite bands is often referred to as "ghost lines." Upon etching with copper ammonium chloride, this ghost line proved to be rich in phosphorus. It is held by many authorities that the segregation of phosphorus in ghost lines is coincident with the expulsion of carbon therefrom. Due to the heterogeneous composition and the many slag inclusions, this material is rather weak.

Figs. 2 and 3 illustrate the effect of cold work on a-b brass. Fig. 2 shows the microstructure of the material before cold working at a magnification of 210 times, and etched with hot sulphuric acid. The polyhedral a-b brass crystals are plainly visible. Fig. 3 represents the microstructure of the same material at the same magnification after cold working. Here the grains are visibly elongated and distorted.

Excessively cold worked brass is subject to season cracking, which are ruptures probably along the cleavage planes of the crystals and are developed in distorted grains. Season cracking is prevented by avoiding setting up excessive internal stresses during cold work, or by reducing such stresses by an-

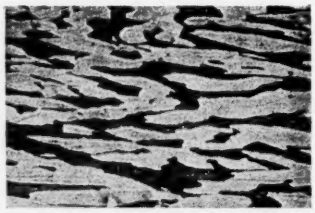


Fig. 3—Brass of the same quality as in Fig. 2 after cold working.

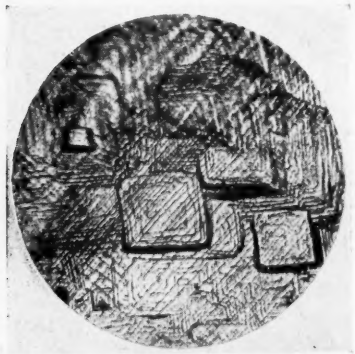
nealing at low temperatures. Brass shows a greater tendency to a local reduction of area during cold work such as drawing, but much less so than pure copper which hardens less rapidly by cold work.

Fig. 4 shows the slip lines of cold worked copper wire magnified 180 times, etched with ammonium persulphate.

In a low carbon steel with 0 11% of carbon, 0.39% of manganese, 0.13% of phosphorus, and 0.02% of sulphur, the ferrite grains were found to be evenly distributed, and inclusions of slag were elongated in the direction of the previous drawing. In the case of this steel it was already possible, after the first pass, to observe a change of direction and an elongation of the grain, which was very clearly recognizable after the third pass. Notable in this case was the behavior of the slag veins after the drawing operation. In the initial material those slag veins had smooth boundaries; after drawing the veins took on a ragged outline. The explanation for this is that the slag which is not plastic in the cold state, is torn asunder in the direction of rolling by successive drawing operations. The individual slag particles are separated from each other and the ferrite crystals are forced into these open spaces, thus producing the ragged appearance. In a similar manner as in the very low carbon steels, the higher carbon steels assume an elongation of their constituent crystals in the

direction of drawing. The previously fine grained pearlite, which after etching appears dark, is drawn out after drawing into long strings, alternating with similar strings of white ferrite.

In order to determine the change of the physical properties of steel wire, after drawing, a series of steel grades with increasing carbon content (0.07% to 0.98%) and whose mechanical and thermal treatments were known, were observed. This material had the form of rolled wire, which was given the final cross section by cold drawing. It is a very well known fact that the carbon content is of the greatest importance to the physical properties of all kinds of steel. The same holds good for cold working. With increasing carbon content, the degree of cold work (diminution of cross section in percentages of the original cross section) decreases. But the original dimensions are not without influence on the degree of cold work that can be



accomplished without injuring the material. Thus a low carbon steel which had an original section of 160 sq. mm. and which was drawn to the breaking point, stood a degree of cold work of 60%, whereas the same material with an original cross section of 21.2 sq. mm. stood a degree of cold work of 96.5%. In the case of medium and high carbon steels, similar properties could be ascertained.

It is easy to imagine that the amount of cold work applied to wire will affect the latter not equally in all its particles, but that individual layers will receive a greater or lesser amount of mechanical deformation according to their location. Likewise, these individual layers will increase in length very unevenly from the periphery towards the center of the wire. To the friction action which the die exerts upon the wire, there is opposed the reaction of the outer layers of the wire, which gradually diminishes from the periphery towards the center. But the outer and inner layers of the steel wire are intimately held together by the cohesive force of the crystals and the amorphous metal which makes up the wire. This cohesive force, to some extent, tends towards a compensation and equalization of the strains and stresses set up by the uneven effect of the mechanical distortion upon the outer and inner layers of the wire. The resulting average force determines the longitudinal expansion or length of the steel wire while it is being cold worked.

Stresses in the Wire

Since these deformations are more elastic than plastic, the resulting state of forces in relative equilibrium consists in the outer layers being subjected to tensile stresses, while the inner layers are subjected to compression stresses. The elasticity of the outer layers is rapidly increased by cold working, while that of the inner layers is not as rapidly and not as favorably affected. If the tension parallel to the axis of the highly elastic outer layers exceeds the elastic limit of the inner layers, the material is said to be "overdrawn". This may and often does result in the inner portions being torn asunder from each other, the path of the fracture assuming a so-called "cupped" aspect, as is shown in figure 5.

Fig. 5

It requires considerable time, months and years, to relieve the strong tensions and stresses set up between the inner and outer layers of cold worked wire, unless these tensions be removed by annealing. Sometimes the

(*Continued on page 28*)

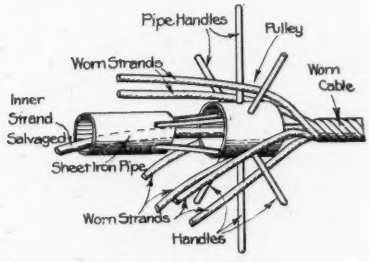
Salvaging Wire Rope

By M. A. Hall

At the plant of a large concern in Cuba, a 3-in. steel cable had its outer strands so badly worn and frayed that it was condemned. As all of the wear was on the outside it was reasoned that the center strand would still be in perfect condition. As there was a great deal of the cable, 1¼ miles long to be exact, it was decided to salvage the good central strand.

This was done by unwinding the cable through the medium of a home-made piece of apparatus. Six pieces of pipe were welded to the outer rim of a small diameter pulley. A short piece of smaller diameter sheet iron pipe was fastened to the pulley in line with it by means of four iron straps. A few feet of the outer strands were unwound by hand, then each one of these was laid between two of the pipes or handles on the pulley. Then the central strand was led through the pulley and iron pipe.

By turning the pipe handles against the lay of the cable and advancing as this was done, the cable outside was unwound so as to expose the central strand. The outer strands were in the



An ingenious device employed to remove the surface strands of a rope.

way, of course, but these were cut off by means of a portable ox-weld outfit as they became unwieldy. An American mechanic planned and carried ou the whole process.

Color in Trade Marks

Recent decisions of Patent Office which set a precedent with important bearing on wire products*

THE right to register a distinctly colored part of a product as a trade-mark has been recognized by the Patent office for many years. Marks of the kind appear to be growing in favor, and hundreds of them are on the registry; but a recent decision of the Patent Office promises to curtail their registration, and if it is upheld by the courts it may seriously affect a number of registered marks.

Assistant Patent Commissioner M. J. Moore has held that painting the handles of kitchen utensils blue may not be registered as a trade-mark. This decision is the result of an appeal to the Patent Commissioner by the Turner & Seymour Manufacturing Company from the decision of the acting examiner of trade-marks granting the motion of the A. & J. Manufacturing Company to dissolve an interference.

The trade-mark of the A. & J. Manufacturing Company, registered August 25, 1925, consists in coloring blue the free ends or tips of handles of tools and utensils, particularly egg beaters and can openers. The purported trade-mark of the Turner & Seymour Manufacturing Company consists in coloring blue the grip portions or handles of egg beaters and can openers—kitchen utensils. The registrant moved to dissolve the interference on the grounds that no interference in law or in fact existed between the marks, and that the purported trade-mark of the Turner & Seymour Company is not, in fact, a trade-mark.

The acting examiner of trade-marks dissolved the interference on the ground that the marks are not confusingly similar; but while he expressed a doubt as to the registrability of the Turner & Seymour mark, he did not decide the question of the second ground of the motion. However, the second ground was held to be material to the question at issue by the Assistant Commissioner. He said that this question should be decided. Then he explained in his decision that if the applicant's mark is not registrable the interference should be dissolved, as the only question presented for decision was the right of the applicant to register his mark. His opinion continues:

"The applicant's mark, consisting in coloring the grip portions of handles kitchen blue, is not registrable, in view of the authorities cited by the registrant in its brief. All handles of household tools and kitchen utensils are necessarily characterized by some color or colors.

Mere Color No Trade Mark

"Kitchen blue is not more distinctive than any other color that may be selected for the handles of articles of trade. No man should be given a monopoly of color alone as a trade-mark. When it is 'impressed in a particular design, as a circle, square, triangle, a cross or a star,' it may constitute a valid trade-mark. (A. Leschen & Sons Co. v. Broderick & Bascom Rope Co., 201 U. S. 167). But standing alone or applied to articles of commerce in the usual way, it fails of distinctiveness and is otherwise devoid of the essential attributes of the subect matter of a valid trade-mark."

It is obvious that the most significant phase of this decision is not the affirming of the examiner's opinion dissolving the interference, but the line that is drawn to regulate the registration of color trade-marks. While, of necessity, human opinions enter into the Patent Office decisions, it is only reasonabe to expect that they will be consistent. But in this case the ruling is not consistent, according to many registrations on file.

Although coloring the handle of a kitchen utensil kitchen blue is held to be not registrable as a trade-mark, the Dunn Pen Company apparently had no trouble in registering as a trade-mark "the little red pump handle" of its self-filling pen. The conventional color of a fountain pen is black, and the entire top of the pumping device of the Dunn Pen is solid red, and is not divided with contrasting colors. It stands alone as a trade-mark; but, as in the other case, it was not held to fail of distinctiveness or to be devoid of the essential attributes of the subject matter of a valid trade-mark.

Registration No. 118178 was granted on August 21, 1917, and it covers a boot with a red band around the top. This mark, also, appears to belong in the same class with the marks just referred to. The mark of the Cleveland Faucet Company, registered in 1896, consists of a representation of an air pump with a red base portion and a yellow body, and in this case the use of two very common colors in combination was held by the Patent Office to be a valid trade-mark.

The Duff Manufacturing Company is the owner of a mark, registered in June, 1911, which consists merely in the use of the distinctive red applied to the head of the lifting bars of the jacks made by this concern. In other words, the painting red of the lifting cars of jacks was considered by the Patent Office to be a valid trade-mark in 1911, and in the statement of the company when it filed its application there was nothing said about contrasting colors, nor was the color of the balance of the jack mentioned.

In 1914, the Wyoming Shovel Works was allowed registration

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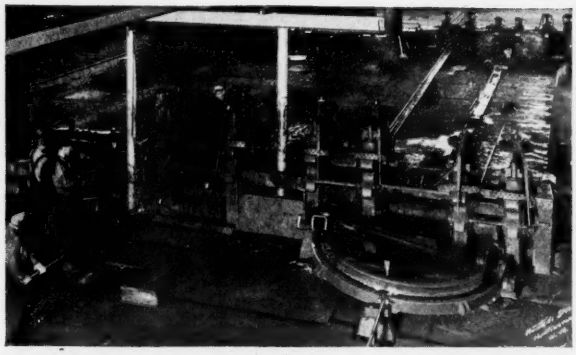
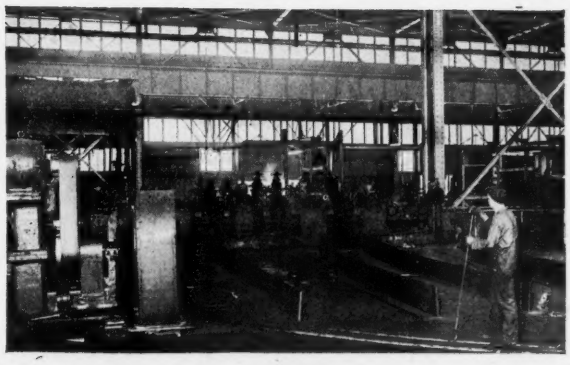
*Reprinted from Printer's Ink.





Views of the rod mill where after several passes on the rollers at left the rod is coiled on the motor driven coiler in the right hand photo.

Working Monel Metal from Two-ton Ingot to Hair-fine Wire

WIRE, fourteen ten-thousandths of an inch in diameter—half the thickness of a human hair—is commercially produced from two-ton Monel Metal or Nickel ingots measuring 13 inches square by 5 feet in length.

As a single ingot contains sufficient metal to produce 85,000 miles of this fine wire—enough to girdle the earth nearly 3½ times—one can imagine that the steps in this operation are both numerous and gradual.

Varied Rrequirements

The many applications of Monel Metal or Nickel in the form of wire naturally required varied properties in the finished product. Careful production has a direct bearing on the physical properties of the resulting wire, and exact control and gradual steps are required to secure wire of a proper structure and strength. For instance, wire to be woven into fine filter cloth must have a high elongation and small grain; whereas for springs, wire must have a high tensile strength and a high torsional moduls.

When these materials are to be worked through screw machines they must have a fine, clean grain, not too hard and yet not too soft, so that they will machine readily at high speed; other uses require other properties to be developed, possibly at the expense of some property which is not necessarily important. In all applications resistance to corrosion is a standard requirement.

History tells us that wire is of very ancient origin. Gold wire was used to form part of a necklace bearing the name of the Pharaoh who reigned in Egypt about 2750 B. C. The Assyrians and Babylonians used wire as far back as 1700 B. C. Very little is known as to the methods of manufacture employed by these ancients, but the specimens found indicate that they were produced solely by hammering. To follow this method today would be an impossible task; nevertheless, hammering forms the first step in the modern production of wire rod from which the finished wire is drawn.

Working Down the Ingots

Hand hammering, however, has been displaced by massive steam-driven hammers under which the ingot, when heated to forging temperature, is placed. With quick, powerful blows the hammers rapidly compress and elongate the ingot, originally five feet long, into blooms nearly three times the ingot length. Strict metallurgical control has supervised the refining of the metal from the ore, while in working down the ingots in the steam hammers exceptional

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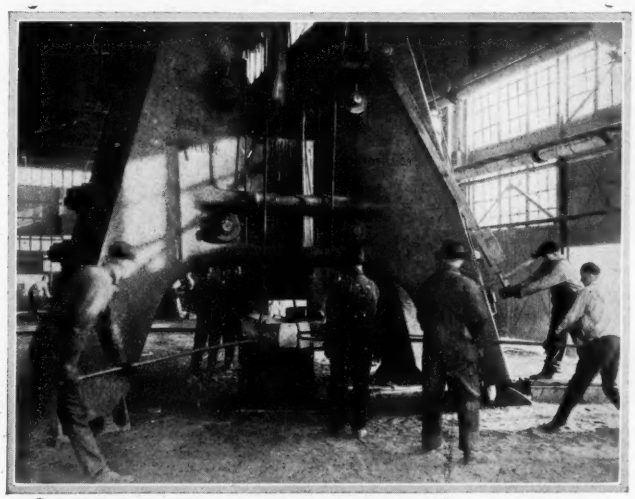
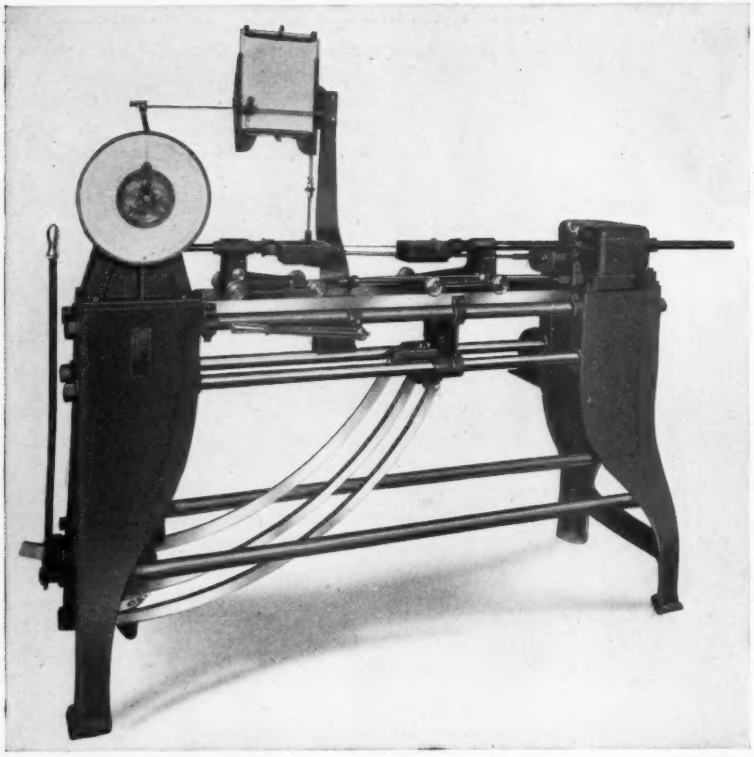


Hammering an ingot.

A New Application for Well-Known Testing Machine

Machines much used in textile and rubber industries are now applied to wire testing

By D. C. Scott



A wire tensile test machine with indicating and recording means.

A LIGHT capacity, quickly operated, non-technical test machine, for use on wire, sheet metal, and other work of this character has recently been developed. It is essentially a routine testing machine, with a maximum capacity of 2000 pounds. For years it has been used in the textile and rubber trades, and has been modified to meet the condition of metal testing.

The cut shows the machine provided with indicating and recording meters for tensile tests. The recording instrument plots the tension and elongation directly on a chart. The clamps of the machine with the specimen in them is located at the top of the machine and the recording chart is above it supported by a vertical arm. The machine is a tensile strength tester, of the inclinable balance or dead weight lever principle. It is arranged with a gear box, the main draw bar of which is directly fastened to the pulling jaw, and so constructed as to be automatic in its action in regard to the return of the pulling jaw to the initial position,

The head of the machine is very rigidly constructed, and has a novel resetting arrangement for its return to zero after a test. There is no liability of injury to the operator in this resetting motion, nor is any great effort required to handle the mechanism.

The drive for the gear box is from a ¼ horse power motor, which can be installed on ordinary circuits. The machine is equipped with an autographic recorder, which is driven in one direction by the motion of the draw bar.

The pen is on a slide, and is moved across the sheet from left to right with the swing of the resisting weight arm of the head. Thus, the two motions are coordinated in one line, the chart being ruled so that this line forms a load stretch diagram of the test, and the perforation of the sample under the tension is thereby clearly defined.

This mechanism is geared so that two inches on the chart represent one inch stretch in the sample. The ruled paper is of standard letter size, and is held on a flat plate. Ruled charts are furnished for use on the machine, but it is not necessary to use the ruled charts, as the lines can be taken on blank paper and compared with a master chart on a light table or ruled transparency.

The object of the machine is to produce these tests with reasonable accuracy with the use of unskilled operators, so that the technical department may confine its attention to the other more important matters than machine operation.

In setting the tensile test chart record, the usual practice of starting the test line at approximately five per-cent of the tensile strength as the initial load, has been followed. As the load readings of the machine start at zero, if this line is taken from the zero point, there is, of course recorded the action of the straightening of the sample, and the drawing in of the clamp wedges for their initial hold on the specimen.

Whereas no attempt is made in this machine to reach the high degree of accuracy required for technical research, it compares very favorably in this respect. This particularly re-

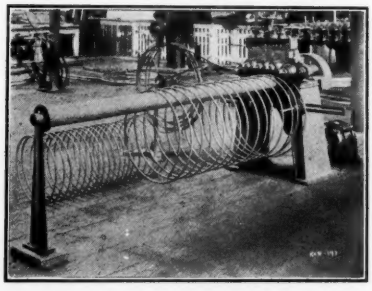
fers to the recording device which is positively connected with the head movement.

If the machine is used with a highly accurate extensometer, or other measuring instruments, as is the common practice, very accurate work can be obtained from it, the calibrations of the head or scale part of the machine being carried out by the dead weight method.

The charts form a permanent record, and in case of necessity, can be reinserted in the machine for a comparison of tests, or a retest. Magnification of the elongation direction of the record is of distinct advantage, particularly where the eight or ten inch initial distances are taken. The machine as ordinarily built, is arranged for a ten inch test sample, but is often made to take longer samples, there being one of recent construction arranged for a 72″ initial test length.

The recording apparatus, operating automatically as it does, registers only separation of the heads of the machine, and has not the extreme accuracy that would be required for research work. It is of a practical nature, nevertheless, and the test can be carried on without interruption to the ultimate rupture of the specimen without danger of injury to either the apparatus or the operator.

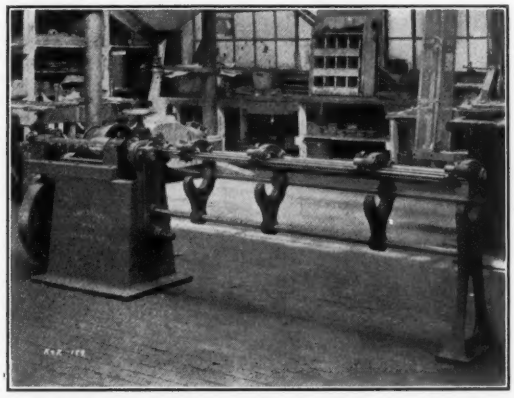
The machine is neither new in its movements nor its construction,—it has been used for many years in textile, leather and rubber industries where the requirements are essentially the same as they are in metal testing, but are made at higher speeds of jaw separation, and with different types of holders.



A new type of coil bender.

New Wire Straightener and Coil Bender

An account of recent developments in wire straightening machines and coil benders



Wire Straightener developed by Kane & Roach.

A NEW automatic rotary wire straightener and cut-off machine has been developed and is depicted in the photograph. The machine can be belt-driven, or direct connection with an electric motor is possible. It is so designed, that it has been possible to eliminate all cross and right-angle belting.

Among the distinctive features which the manufacturers believe are not to be found in any other straightening roll of this type, is the three-step, cone pulley drive for the feeding rolls. With such a drive, change of running speed becomes feasible, so that when straightening light or soft material, the rolls can be run at high speed, while with springy or stiff stock, the feeding rolls can be driven at a slower delivery speed.

A pair of pinching rolls is placed between the rotating straightening head and the automatic cut-off shear. By means of these rolls, the wire is fed through the straightening head and then passes into a guide-bar grooved in a suitable manner.

An adjustable stop guage in this guide-bar automatically trips a cam at a fixed point, thus operating the shears which cut the material to accurate length. Shearing is effected as the guide-bar automatically opens and permits the wire to drop beneath into the forks. Dies suitable for wires of different diameters with which the automatic shears are equipped, enable the wire to be given a clean shear, free from any distortion or burr. The balance wheel which drives the automatic cut-off shears is conveniently located underneath the frame. Dumping tables and automatic cut-offs are available in various lengths.

The thickest wire the machine can deal with is ⅜ of an inch, but wires of many sizes less than this maximum diameter can be straightened by it. As shown in the photograph, an additional set of three straightening rolls is provided at the feed end of the machine. Besides these a set of pinching rolls mounted in front of the straightening rolls can be provided when the occasion calls for it.

A complete set of adjustable dies, which may be made of gray iron, gun metal or hard iron, depending on the nature of the material to be straightened, is

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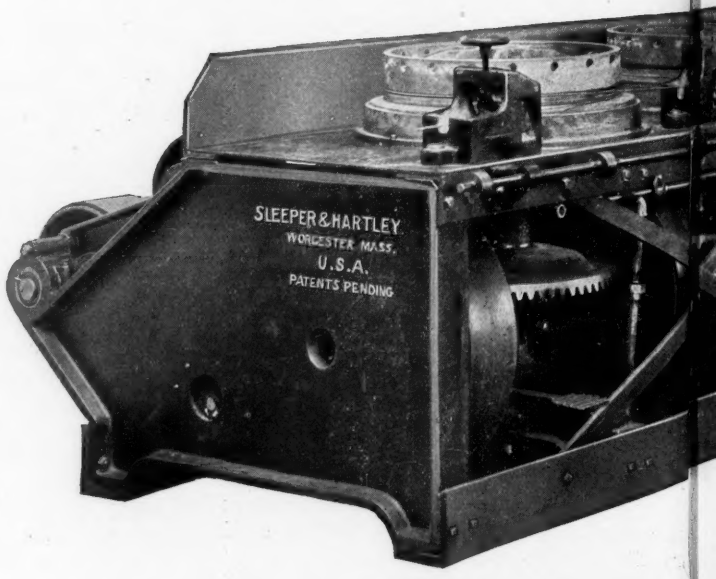
CONTINUOUS WIRE D

Sleeper & Hartley
TRADE MARK

Patented in United States of America and the Principal Foreign Countries



CONTINUOUS ROD FRAM
Built with 3, 4 o

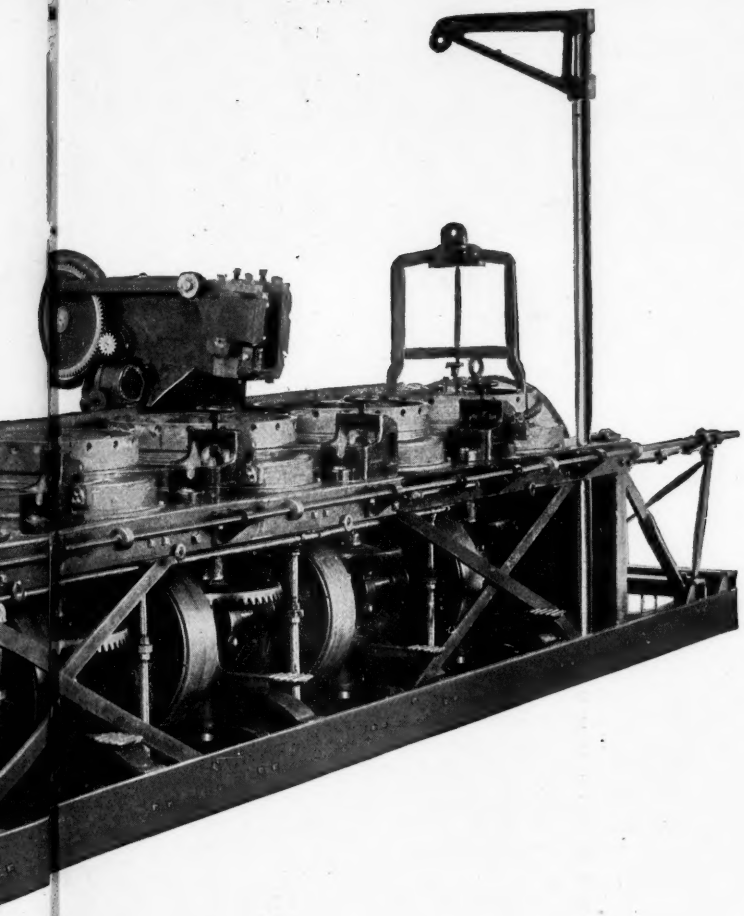
This machine is built without differential gearing of ar
of drawing heads These machines are put into produ

AGENTS: CHICAGO TERRITORY, Neff, Kohlbusch & Bissell, Inc.

WORCESTER SLEEPER & I

FOREIGN AGENTS AND REPRESENTATIVES: UNITED KINGDOM—Mr. Fredk. A. Perry, 63 Queen Victoria St., London. E. C. 4. FRANCE—Mr. Edgar Bloxham, 12 Rue du Delta, Paris. BELGIUM—Isbecque, Todd & Cie., 25-27 Boul. Emile Bockstael, Brussels.

DRAWING MACHINERY



Steeper & Hartley TRADE MARK

An All-Ball-Bearing Machine

High Production

Low Maintenance Costs

Machine shown here is set up to draw No. 5 to 15

Runs off 4170 lbs. in 10 hours

RAM—No. 5 to 14 or 15 WIRE

4 or 5 heads, as desired

f any kind. Automatic compensation for variations in speed roduction immediately after making the motor connections.

& HARTLEY, Inc. MASS.

ITALY—Henry Coe & Clerici, Milan. AUSTRALIA AND NEW ZEALAND—Edwin Wood Pty., Ltd., Melbourne.
JAPAN—Andrews & George Co., Tokyo. SWEDEN AND FINLAND—Akt., Rylander & Asplunds, Stockholm.

EDITORIAL · IMPRESSIONS

A First Glance: 1927

IT is remarkable that—in spite of the reputed energy and alertness of American sales practice—many American manufacturers of wire drawing machinery, and of machinery for the manufacture of wire products are idly standing by while foreign products make their inroad into the country. With that irrepressible enthusiasm and skill that has marked the development of German industries before 1914, post-war Germany is reestablishing her industrial prestige abroad. There is an atmosphere of bustle among importers and a campaign of judicious advertising has been launched by all of them.

In the meanwhile, American manufacturers have done little or nothing to counter this competitive challenge. We make no suggestion of protective tariff for even if there were any need for it we do not believe it advisable. In fact these foreign machines sell not because of lower price but through superior publicity and in a few cases because of improved quality.

Our domestic machine makers are resting on their glories, and pass by every opportunity for favorable publicity, which, however is promptly taken up by the enterprising and aggressive foreign importers. These are imbued with the energy of men who have a new field to conquer and it is time the American manufacturers did more than hold their own.

The longer experience of Europe in the wire industry demands double the skill and effort on the part of American engineers and manufacturers. It is wise to recognize occasional superiority in the foreign machines, but it is better business to reassert the advantages—of which there are many— that the domestic wire drawing, chain, needle, and other machines offer.

And a brief survey of American manufacturers for the wire industry shows that they have not given that publicity to their products which they deserve and which foreign competition demands!

Wages, Work and Surplus

ACCORDING to James J. Davis, Secretary of Labor, the United States has never been in a situation more prosperous and contented than the present. While some doubt may be raised as to contentment, it is undeniable that there has been a general increase in prosperity and a marked rise in purchasing power of the population is noticeable.

With reference to the current discussion of the relation between high wages and prosperity Mr. Davis says:

"We are proud to be able to compete on the basis of price and quality, in many of the markets of the world, not only because business from whatever source is desirable but because in so doing we prove that the high wage standard and shorter work day and the resultant better living standard for our people are not irreconcilable with low price and high quality when machines are used to supplement human labor."

Whatever the casual connection between high wages and business prosperity the two are coexistent in the United States, and makes the present industrial period especially gratifying. A nation—says Mr. Davis—is "not truly prosperous unless everyone has some degree of surplus, or wealth, over and above the requirements for actual existence."

"We are prospering, therefore, on machine wealth created at home, and made possible by the higher wages and shorter hours which enabled men to buy products of that wealth."

That such increase in general welfare and business activity is genuine is shown by statistical reports. There is a generally increased insurance, home buying, automobile purchases, savings banks deposits and so on. And all this in spite of—or perhaps partly because of?—the persistent tendency towards shorter hours. But the deeper and truer cause of our national prosperity lies in the unexampled efficiency in production and management that has developed in the United States.

Educating the Consumer

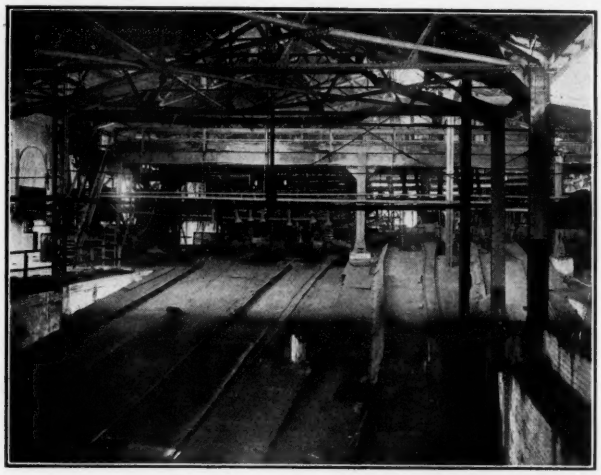
"ADEQUATE house wiring" remarks a contemporary in a recent issue "is largely a question of education and selling." And this we might add is best accomplished through the concerted action of electrical wire manufacturers at large. There is a great opportunity to enlarge business by the extensive distribution of information about the latest, most convenient and safest use of house wiring. Such cooperation between manufacturers and builders and contractors can go far toward a very substantial increase in the consumption of wire and at the same time, towards initiating improvements and added conveniences in house wiring.

The journal quoted above, gives an interesting account of how—in one instance—such campaign of education has worked out. The attempt met every expectation and promises greater success for the future.

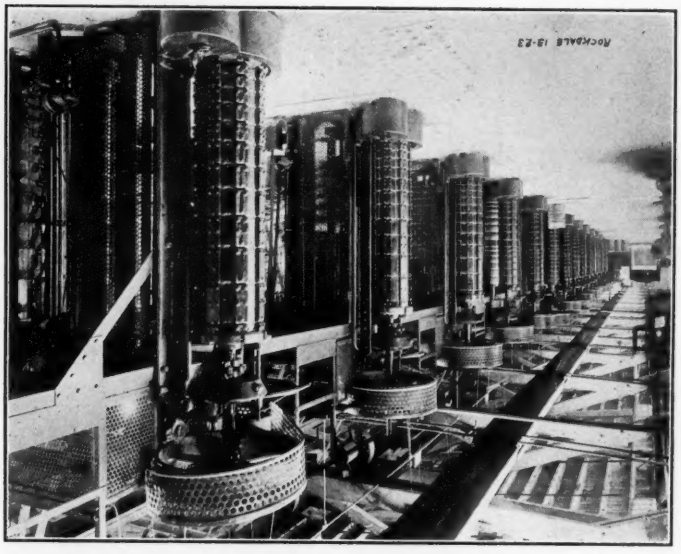
We mention the instance in illustration of our old thesis that the wire producers might advantageously maintain an organization which through their united effort could take effective measures towards an accelerated development of the trade.

WIRE
& WIRE PRODUCTS

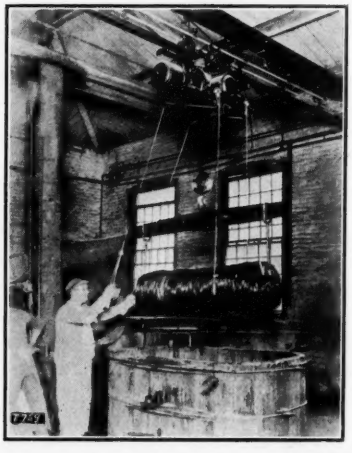
VIEWS OF THE WIRE WORLD



A view of the rod mill of the Newburgh Steel Works, of the American Steel & Wire Co.



At right: An example of thoroughly guarded machinery in the fence department of the Rockdale Works, American Steel & Wire Co. All moving parts are shielded.



At left: A continuous system of traveling cranes conveys the wire through all the operations in this plant. The coils are about to be immersed in the pickling bath.

If you have photographs of interest to the Wire industry, send them to Wire & Wire Products

The Manufacture and Use of Chain Link Fence in Europe

By Dr. Ing. Otto Schmid

TO study the use of chain link fence or otherwise called DIAMOND MESH wire netting one has to go to Europe. Twenty years ago there was hardly any fence of this style used abroad. At that time it was made by hand. That is why it was handicapped in price and output against other wire-work, poultry netting and wooden fences.

The invention of the single spiral chain link fence machine in Germany in 1909 brought on the change. In the following years the competition especially between poultry netting and chain link fence began. To a great extent hexagonal poultry netting was wormed out of its place on the market in favor of chain link fabric. Today one can safely say, that in Europe chain link wire netting has conquered the market where otherwise poultry netting special wire work or wooden fences have been used.

Now, where one sees a fence or a wire guard, it is made of chain link netting. One passes a tennis court or a football ground—they are enclosed with chain link fence. Every railroad station, school yard children's play ground, private garden or estate is fenced in with chain link fabric.

But the use of chain link fabric is not only limited to outdoor fencing. There are hundreds of other possibilities for its application in industry and commerce. In buildings one sees chain link netting used for elevator enclosures, window- and fire-guards, in factories as partitions, machine and belt-guards and conveyor belts. In commercial goods chain link netting is applied for instance as sieve and riddle in agricultural machines, as sidewalls in children bedsteads, as potatoe and paper baskets and tree guards.

Only lately chain link wire netting was introduced for use in reinforced concrete, road and dike-construction.

In Europe chain link fabric is marketed in standard gauges, meshes and widths, according to its particular purpose from ⅜″ mesh No. 20 Gauge to 6″ mesh No. 6 Gauge wire. It is quite interesting to learn, that in different countries they are

A type of chain link fence pointed at top and turned-under ends at bottom.

using chain link fence of more or less heavy gauges of wire. For instance in England chain link fabric for fencing purposes is made practically only of No. 11, No. 9 and No. 6 Gauge (St. W. G.). In Belgium, France and Germany one uses for fences mostly No. 14 and No. 11 Gauge and meshes 1⅝″, 2″ and 2½″. Further east in Czechoslovakia, Jugoslavia and Hungary the usual sizes of wire used in chain link fence are No. 16 and No. 13 Gauge for 2″ mesh. Every hardware store has the standard meshes 1″, 1½″, 2″ and 2½″ in 4 to 6 ft. widths in stock. The chain link wire netting became so popular, because it is very cheap and simple to erect, and when put up properly it makes a good looking fence.

The greatest amount of the whole output of chain link fabric in Europe is made of galvanized wire, only a very small quantity of it is galvanized after being woven. The common argument against the chain link fence woven with galvanized wire, that it gets rusty too quick, is not quite justified. The corrosion of the wire depends altogether on the quality of the spelter the galvanization, as well as on the care which is being taken in weaving the fence.

The weaving of chain link fencing was done on non-automatic looms until 1909, when the single-spiral automatic was introduced. From that time on the nettings from 1½″ to 3½″ mesh were made automatically, while the smaller sizes were still made by hand. It is only recently that the methods of manufacture have changed by the invention of a double spiral chain link loom, by which not only the production was raised almost 100%, but by the new principle of this weaving loom it was possible to produce chain link wire netting as small as ⅜″ mesh completely automatically. This new principle rests on a mandrel wherein two wires can be worked at the same time.

Wafios Spring Coiler

Current Exhibition of Machinery in New York City

AN improved spring coiler is on exhibition in New York City. The principles of this machine differ somewhat from the general type used in this country. The machine is built on the clutch type. The wire length of the springs is regulated by shift gear mathematically exact. Practically the longest possible springs can be cut automatically. The winding apparatus of this machine consists of two winding tools which are universally adjustable. The adustment of the spring diameter by means of the two winding tools is constructed on scientific principles, so that the load of winding the spring is distributed equally on both winding tools and the position of the latter is automatically regulated. These features reduce the power for winding the springs considerably, while the pressure of the feed rollers on the wire can be much lower, thus reducing the deformation of the wire. The arbor, which

(*Continued on page 27*)

KENWORTHY

NONOXIDIZING

ANNEALING FURNACES

ELECTRIC

OR

FUEL HEATED

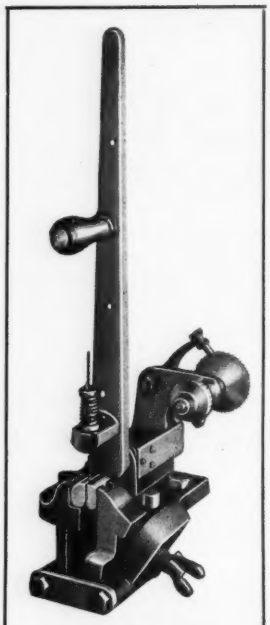
WET OR DRY TYPES

❦ ❦ ❦ ❦

CHARLES F. KENWORTHY
(INCORPORATED)
WATERBURY CONNECTICUT

AGENCIES:
LARMUTH BROS., MANCHESTER ROSENBERG & CO., BERLIN

SOLE U. S. AGENTS
FOR GENERAL ENGINEERING CO.'S EJECTAIRE AND VACUUM EQUIPMENT
FOR WIRE INSULATING PLANTS



Amsler's Wire Ductility Tester

The "Usefulness" of Wire in the Manufacture of Wire Products depends in Most Cases upon its "Ductility"

The best apparatus for investigating the ductility of round and flat wire, ferrous and non-ferrous, is the "Amsler Reversed Bending Tester" illustrated above.

This apparatus gives very valuable information. It can be operated by any intelligent man in the shop and it is inexpensive.

Every wire forming shop should be equipped with this handy, practical wire tester. Some plants are using a number of them in different departments.

Write for Full Description

HERMAN A. HOLZ

Testing Engineer

17-B Madison Ave. New York

Complete Line of High Quality Metal Testing Machines.

NEWS OF THE INDUSTRY

AN addition to its branch factory at Chattanooga, Tenn., is said to be in contemplation by the Williamsport Wire Rope Company, Williamsport, Pa. The cost may exceed $30,000 with equipment. The company's Chattanooga manager is F. R. Saunders.

THE Keystone Steel & Wire Co., Peoria, Ill., manufacturers of wire products has appointed Theodore Geissman & Co., 624 South Michigan Blvd., Chicago, their district sales agents.

AN aerial tramway is contemplated for its local mines by the Zonolise Co., Libby, Mont.

PLANS for a new two-floor factory are being drawn for the New York Bed Spring Mfg. Co., Detroit. The cost of the new plant will be about $50,000, and I. M. Lewis is the architect.

THE sales department of the Ziv Steel and Wire Co., Chicago, has recently added to its staff P. L. Getzinger, who was formerly Chicago representative of the Kinite Co , Milwaukee.

A PERMIT to erect a one-story addition costing about $27,000 has been granted the Safety Cable Co., of Bergen Point, Bayonne, N. J.

A RECENT purchase by the American Steel & Wire Co., Worcester, Mass., from the Reading Chain and Block Corporation consisted of 160 hand power cranes, capacity 10 cwt., together with electric hoists of similar capacity for six of their plants.

THE Koehring Co., Milwaukee, makers of hoists, paving machinery, etc., have let a contract locally for an addition to their plant.

AT THE POWER SHOW

AN interesting exhibit on the main floor (Booth 65), is that of the American Brass Co., Div. of the Anaconda Copper Mining Co. There was a goodly display of copper, brass, and copper-alloy wire, both bare and covered, single and multiple strand. Trolley wires of 5 different grades were on view, ranging from hard drawn copper with a tensile strength of 22 tons per square inch for 4/0 size, to a cadmium bronze alloy with tensile strength of 32 tons. The conductivity ranged from 97.16% I. A. C. S. to 55% for cadmium bronze wire at 20° C. The latter wire as well as the company's bronze trolley wire is recommended where a stronger, longer wearing wire is needed. Such conditions arise where traffic interruptions would be unusually costly and inconvenient as in subways or mine tunnels. All grades of Anaconda trolley wire are made in round, grooved and figure 8 sections.

THE Biax Flexible Shaft Co., of 136 Liberty St., New York. featured at Booth 757 an interesting display of their flexible drives for a variety of tools and operations. Several appliances were in operation, notably rail grinding and drilling equipment. The flexible shafts can be supplied in lengths up to 36 feet with from 2 to 10 windings. The outer casing consists of zinc plated steel and is oil tight. Inside this is a coil of tempered steel flat wire spring to impart flexibility to the casing. The drive proper consists of a core of wound piano steel wire and is usually wound for counter-clockwise operation, but reverse windings are available.

INCLUDED in the booth of the American Engineering Standard Committee (No. 615) were displays of the various products of the Standard Under-

Safety!

EVERY safeguard possible is employed in the **MOTOBLOC**,—the modern wire drawing machine—to eliminate the hazards of wire drawing practice. The safety bar,—a **VAUGHN** feature—will apply dynamic braking and stop the machine instantly with but a few inches of travel—all moving parts are protected.

Add this feature of safety to the many other points in which the **MOTOBLOC** excells—speed—production—flexibility—costs—and you have the one ideal wire drawing machine.

THE VAUGHN MACHINERY COMPANY
Cuyahoga Falls **Ohio**

Vaughn *motoblocs*

‖ PATENTS APPLIED FOR ‖

Specializing in the Manufacturing of REELS & SPOOLS of all sizes.

For Annealing and Handling Fine Wire

We solicit your inquiries

For Use in Vulcanizing and Impregnating Wire (Pat. Pending)

Mossberg Pressed Steel Corporation

81 WEST ST., ATTLEBORO, MASS.
2051 Grand Central Terminal, NEW YORK CITY
Russell A. Singleton, 713 Slaughter Bldg., DALLAS, TEX.
140 S. Dearborn St., CHICAGO, ILL.
101 Augusta St., GREENVILLE, S. C.

ROTARY WIRE STRAIGHTENING AND CUTTING MACHINES

FULL AUTOMATIC

Equipped with flying shear allowing uninterrupted feed of wire through the machine.

Guaranteed not to mark or swell wire in spots.

Write for Bulletin

HALLDEN MACHINE CO.

Thomaston, Conn.

ground Cable Co. of Pittsburgh, Pa., and of the Rockbestos Products Corporation. The former consisted of an exhibit of underground cable ranging from the single bare conductor of 14 B. S. to very complex multiple insulated cables. The latter company's display consisted of asbestos insulated electric conductor.

OTHER exhibitors of interest were the Bethlehem Steel Co., the Tinius Olsen Testing Machine Co., the Clipper Belt Lace Co., Grand Rapids, Mich, and the Q-P Signal Co., Needham Heights, Mass., (copper and brass wire covered packing).

THE Washburn Wire Co., 550 East 118th St., is to erect a one-story building at 542-46 E. 117th Street, New York City. The architect is J. P. Walther of this city.

TWO one-story structures are under way for the Birmingham (Ala.) Fabricating Co. for the manufacture of wire goods and other iron and steel specialities. The chief executives are L. H. White and C. F. Hyrne.

THE L. A. Young Industries, Inc., Detroit, who manufacture springs among other things, are about to begin erecting a new power plant to serve the present and new units. This will cost about $200,000, while a new works unit costing close on $1,000,000 is nearing completion, a portion of a $3,00,000 expansion program.

PROGRESS is being made with the erection of a plant addition to the Montreal Armature Works, Ltd., Montreal, Canada. Similar news is to hand from the Central Spring Co., Oslawa, Ont.

A GENERAL contract has been awarded by the William Wurdack Electric Mfg. Co., cable makers, of St. Louis to the Kremer-Virol Construction Co., also of St. Louis, for the construction of a new plant and equipment at a cost of $75,000.

WM. L. JONES, president of the Jones & Laughlin Steel Co., Pittsburgh, died on Nov. 25 at his home in that city. He was born in 1863 and graduated from Princeton in 1888. He succeeded his father in the position of general manager and became president of the corporation in 1922.

THE installation of equipment including cranes for handling cereals at the Port of Marseilles has been authorized by the Department of Works of the French Government.

JAS. B. ROBERTS and E. P. Carey have been appointed assistant general managers of sales at the Youngstown office of the Youngstown Sheet & Tube Co.

GEORGE M. EATON, chief mechanical engineer of the Westinghouse Co., East Pittsburgh, Pa., is now associated with the Molybdenum Corporation of America, Pittsburgh. In his new capacity he will be sales engineer for the development of molybdenum steels.

CREDIT is due to the Class magazine for permission to reprint the article "How Wire Firm Merchandises its Campaign" which appeared in the December issue of WIRE & WIRE PRODUCTS.

Wafios Spring Coiler

(*Continued from page 22*)

in most other machines is used for cutting and winding the spring, is used for cutting the spring only. With one cutter mandrell springs of all dimensions and diameters can be made. It is obvious that the adjusting of this spring coiler is simplified by these improvements. The Wafios people are well known in Europe as the builders of spring coilers.

Continuous Wire Drawing Machines

Spooling attachments

Multiple head spoolers

Draw frames and rolling mills

Any and all modern equipment for the wire mill.

CYRUS CURRIER & SONS

NEWARK, N. J.
365 Market St.

Continuous Wire Drawing Machine

A light, compact, and inexpensive machine of the ball bearing type, for rapid and economical production of fine wire.

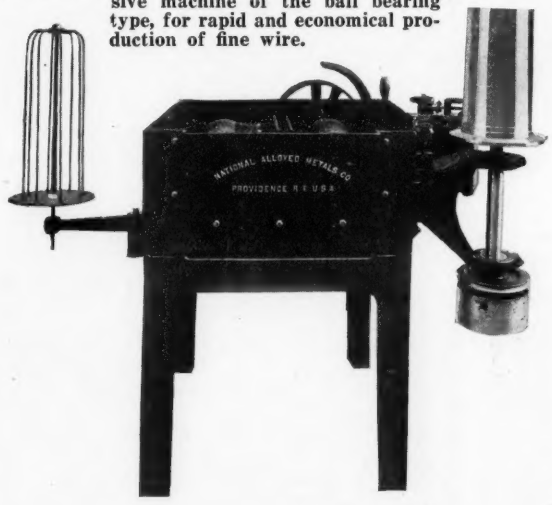


Illustration features No. 2 Machine. Capacity No. .20 B & S to .003.
We will furnish information on other sizes.

National Alloyed Metals Co.

69 Sprague St. **Providence, R. I.**

Pressed Steel Reels that Come Back for More!

TONS of fractious, unwieldy cable require "American" Pressed Steel Reels. Practically indestructible and stronger. Wire manufacturers have found "Americans" more convenient and more economical for handling their product during all the processes of manufacture. Made in sizes ranging from 2½ inches to 8 feet, for vulcanizing, drawing, braiding, stranding, impregnating, annealing, shop use and shipping.

Whether it is a stock model or one built specially to your specifications, you can be sure that it is true to specified gauge—built with the same religious precision as are "American" Pressed Steel Pulleys and Shaft Hangers.

The American Pulley Co.

Manufacturers of Steel Split Transmission Pulleys, Pressed Steel Shaft Hangers, Pressed Steel Hand Trucks and Pressed Steel Shapes

4200 Wissahickon Ave. Philadelphia

AMERICAN PRESSED STEEL REELS

The "Superior" Wire Drawing Machine

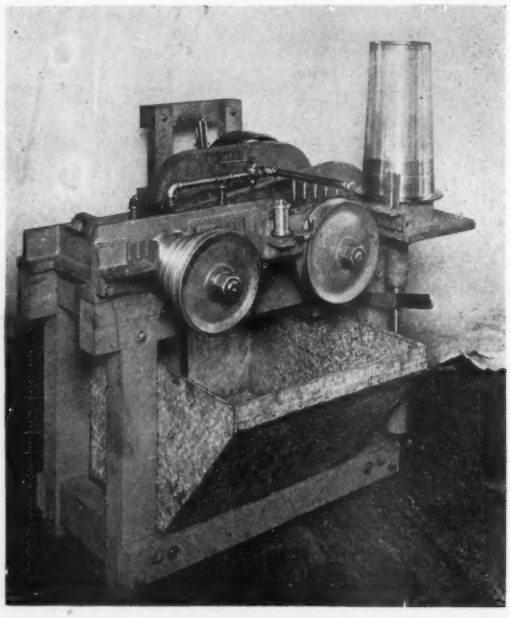
The ultimate in a compact and inexpensive machine.

One man efficiently operates 6 of these machines simultaneously.

6 Draft Wet type. Capacity .032" to .004".

Floor Space 39"x54"

Designed & Manufactured by



The Superior Tool & Mfg. Co.

172 Union St. Worcester, Mass.

VICE-PRESIDENT H. E. Lewis of the Bethlehem Steel Corporation was the guest of honor at the Bethlehem, Pa., Chamber of Commerce, Dec. 6.

CONTRACTS for a machine-shop addition to cost $20,000 approximately, have been awarded by the Emsco Derrick and Equipment Co., Los Angeles, to the Union Iron Works. The former concern is a combination of the Emsco Tool Co. and the Emsco Steel Products Co., president, E. W. Smith.

Physical Properties of Wire

(*Continued from page 13*)

internal tensions due to cold working of steel wire are so great, that sudden breaks and fractures take place without these pieces being subjected to any external mechanical or other action. The same effect may be brought about when the wire is being used or when it is subsequently being unevenly heated or cooled.

Cold worked material is subject to a peculiar change of its physical properties which usually occurs after "ageing" of the metal. With increasing ageing, the elastic limit, the yield point and the tensile strength of the material increase, whereas the elongation and the reduction of area decrease. These changes are more pronounced immediately after cold working than later. It is thus to be seen that ageing has the same influence upon the physical properties after cold working has been completed, as cold working of wire will normally have by itself.

Color in Trade Marks

(*Continued from page 14*)

on a red band around the lower edge of a shovel. F. W. Bird & Son is the registrant of a trademark which, according to the statement filed, "Consists in means for identifying paper of our manufacture, which is ordinarily put up in rolls, a band

of blue color around the ends of rolls of paper."

Apparently, the American Lead Pencil Company had no difficulty in 1907 in registering as a trade-mark a blue band for lead pencils and point protectors, for the files show that the company owns such a registration. However, the majority of the many registrations for lead pencils deal with contrasting colors, and typical of this class is the registration of a mark by Faber, which is described by the statement as follows:

"My trade-mark consists of a circumferential band of yellow or gold color contrasting with a darker color on both sides thereof and produced on the tip of a lead pencil or a representation thereof."

But the case under discussion deals with a single color as applied to a single part of a device or product. Among the registered marks, red appears to be the favorite color, and it has been used so frequently as to become rather ordinary rather than distinctive. Therefore, it would seem that the right to consider the blue handle of a kitchen utensil a trade-mark is just as consistent as to accept as a trade-mark the red cover of a small box. But the Patent Office has decided that the blue handle is not registrable, while it granted to The Wahl Company a registration for a mark to identify boxes of pencil leads, which is described in this manner by the statement:

"The mark consists of the box having the top or cover thereof colored red and having inscribed on one of the wider sides 'Red Top Eversharp Leads Trade-Mark' and on the opposite side 'The Wahl Co., Chicago,' no claim being made herein to the words 'The Wahl Co..,' 'Chicago,' 'Trade-Mark' or 'Leads' except in association with the other features shown." In 1925, the same company secured registration on a mark consisting "of a label or container having a red border at its top."

In view of these registrations and many others of the kind

"What is the WEAK SPOT in Annealing?"

"Personnel?"

"No!"

"Facilities?"

"No!"

"What, then?"

"OBSOLETE METHODS!"

OBSOLETE methods cost money in the plant that relaxes a constant vigilance.

When a furnace manufacturer relates of saving $2.58 on fuel cost per ton of metal annealed you can make up your mind that there is "Something rotten in Denmark," for this **"saving"** is **four times** as much as the cost should have been.

The cost for fuel per ton of metal annealed should not exceed $.60 (sixty cents). It is, therefore, incompatible with modern methods to effect a **saving** of $2.58. Only by comparison with methods long obsolete could such a **"saving"** be effected.

If you will advise us of the kind and volume of annealing you do, we will show you some facts and figures that will convince you of the merits and economy of the **Bellis Lavite Process** for **Annealing.**

THE BELLIS HEAT TREATING COMPANY
Branford, Conn.

Metal Spools for Wire Drawing

Metal Spools for Annealing

Metal Lined Spools for Shipping

Metal Lined Reels for Shipping

Hubbard Spool Co.
1622 Carroll Avenue
Chicago

F. KRAUSE DIAMOND DIES

All sizes, immediate deliveries.
Dies for High Speed Wire Drawing Machines guaranteed.

F. KRAUSE & CO., Inc.
Jersey City, N. J.

Phone: Webster 5105 250 OGDEN AVE.

NEW YORK GENEVA

DIAMOND DIE COMPANY of AMERICA

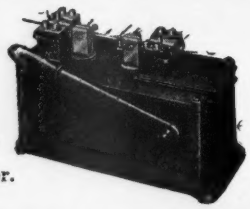
Manufacturers of Steel Set Diamond Draw Plates
For drawing all kinds of wire

Recutting
Repolishing
Repairing
Prompt shipments

"STEELITE SET"

118 West 32nd St., New York City Phone, Penn. 4226

Standard Electric Wire Pointer



Made in THREE sizes:
No. 1 machine—Capacity up to No. 12 wire.
No. 2 machine—Capacity up to No. 5 wire.
No. 3 machine—Capacity up to 5/8" diameter.
(Wire gauge—W & M standard)

Operates on either 110 or 220 volts, single phase alternating current.
Particularly adapted to shaped wires.

STANDARD MACHINE WORKS
100 Lamartine Street WORCESTER, MASS.

ROBERTSON'S SOAPS

MANUFACTURERS OF WIRE DRAWING SOAPS
SINCE 1895

THE J. T. ROBERTSON CO., Inc.
Syracuse, N. Y.

CABLE ADDRESS, ROBECO. 147 RICHMOND AVE.

which could be cited, the indications are that the Patent Office has decided to restrict the registration of colors as trademarks. This is the opinion, based on the decision under discussion and other evidence, of several prominent trade-mark attorneys in Washington.

New Wire Straightener

(*Continued from page 17*)

provided for the rotating head.

Finally, we may add that several sizes of these machines are available.

The other photograph depicts a new coil bending roll recently developed and marketed. Coils made by this machine are used for the reinforcement of cement conduit, sewer pipe and concrete work in general.

With this machine it is possible to bend stock with diameter from one-eighth to five-eights inch inclusive, but the particular roll featured in the illustration is cut with passes for bending three-eights, half and five-eights inch round stock into circles of any desired diameter on the same set of rolls.

The machine has several important features and these will now be dealt with. To ensure that the material entering the bending roll is of a uniform diameter, a set of six straightening rolls is provided. These not only remove kinks and bends, and break the backbone of the material, but also neutralize the hard and soft spots.

The machine is equipped with cut steel driving gears, while all the lower rolls and two of the upper rolls are gear driven. These rolls are built of high carbon steel, heat treated and hardened, and are provided with passes cut to suit the material undergoing treatment.

A feature of the machine, and one which greatly facilitates readjustment when the diameter of the stock has to be changed, is the pointer and scale attachment to the upper straightening rolls. The latter are adjustable and the attachment mentioned, enables a

record of the settings required for stocks of various diameters to be kept.

Similarly with the bending roll, which is an idler, the pointer and scale attachment in this case, permitting a record of the settings for various diameter circles to be kept. Two adjustments are possible with this roll, one enabling a coil to be made with any required diameter, an in-and-out adjustment, which permits the spacing of the coil to be regulated.

Two side rolls, in addition to the straightening and bending rolls already described, enable the coiling operation to be controlled and maintain the diameter of the coil constant. As in the case of the straighteners and bending rolls, two adjustments are allowed for, one for the diameter of the coil, and the other for its spacing.

When the machine is to be used for bending coils of large diameter, the machine is provided with a third lower roll placed directly beneath the straightening rolls. Like the others, this roll is also capable of two adjustments.

A revolving arbor for the coil is provided, and is connected with the lower roll as illustrated, and also supported by an outer bearing. This revolving arbor is desirable for two reasons; firstly, to enable it to carry the coil along with it and secondly, to obviate strain or back spring. If the coil were compelled to rotate round a stationary arbor; it can readily be seen that as the weight and length of the coil increased, a springy product and one lacking in uniformity would be the result.

The outer bearing referred to can be moved by hand, or for quick removal, it may be mounted on a slide rail. In this way the arbor can be withdrawn and the coil taken off when completed.

The machine can be arranged for direct connection with an electric motor or for belt-drive from shafting, and is made in several sizes.

Wire Drawing Soaps and Compounds

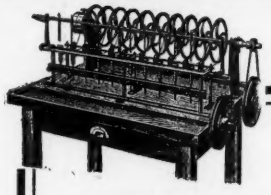
STEELSKIN BRAND
(Registered)

For High or Low Carbon Wire

Working Samples sent on request.

Established 21 years.

R. H. MILLER CO., INC. **HOMER, N. Y.**



"POHENKRA" WIRE DIE POLISHING MACHINE

Indispensable For All Kinds of Wire-drawing

U. S. Patents
983929—1911
1039186—1912
England 16171
1910
France 420503
Germany 226062
Austria 46389

Gives an absolute guarantee of grinding the diamond holes perfectly round, a result hard to accomplish with all devices employed before.

Simultaneously grinds the entire wall of the draw stone, including the inlet and outlet.

Ten times more effective than previous devices; one workman unassisted can polish 30 diamonds simultanously.

Write For Descriptive Literature

F. KRAUSE & CO., Inc., 250 Ogden Ave., Jersey City, N. J.

KILMER LITTLE GIANT WIRE FORMER

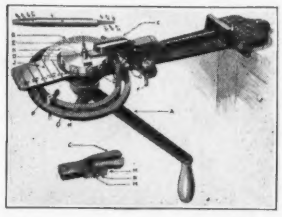
Forms Eleven Sizes of Eyes from Round, Square, Flat or Half-Round Stock, also almost any shape desired Quickly and Efficiently.

Adjustable for No. 3 to No. 24 Gage Wire.

The cut on the left shows a few of the thousands of the forms made on this

FORMER

Price $35.00



Patented April 2, 1918

M. D. Kilmer & Co.

Cleveland, Ohio, U. S. A
Box 237, Station B.

(14)

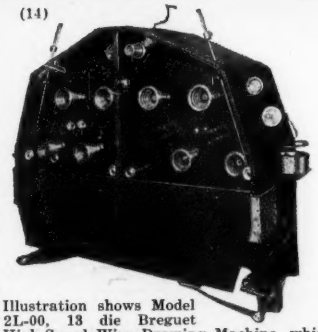


Illustration shows Model 2L-00, 13 die Breguet High-Speed Wire Drawing Machine, which draws No. 36 Brown and Sharpe Gauge and finer sizes of copper wire at a finishing speed of 4000 to 4500 feet per minute.

EST. 1855 AIMCo INC. 1915

"American" INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

517 Huntington St.

PHILADELPHIA PENNSYLVANIA U.S.A.

EXCLUSIVE AGENT FOR

the United States, Canada, Mexico, Central and South America of the

BREGUET HIGH-SPEED WIRE DRAWING MACHINES

Patents Applied For in the United States. Patented in France and Great Britain

SEND FOR CATALOG

Continuous Wire Drawing Machines
for
Dry or Liquor Finish
No. 15 Frame—Patenting Takeup
All Kinds of Draw Benches and Wire Mill Supplies
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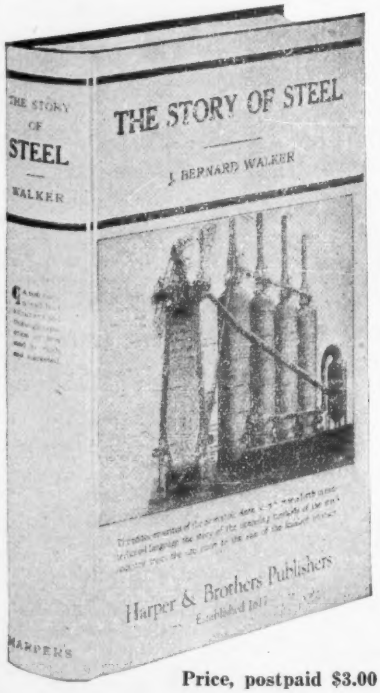

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(*Continued from page 15*)

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Industrial Housekeeping

(*Continued from page 10*)

ty—these and numerous other advantages are inseparable from a clean plant—all opinions to the contrary notwithstanding.

It would be nothing short of presumption for the writer to attempt to lay down any rule or set of rules for others to follow. Every Works' Manager will solve this problem in his own way. We do, however, take the liberty of concluding this article with ten suggestions, all of which have proved helpful in our own experience.

FIRST—It is of paramount importance that the Works' Manager or Superintendent possess and always exhibit an earnest determination to maintain a clean plant at all times. This desire must be so pronounced that there will never be any misunderstanding as to his attitude in the matter of housekeeping.

SECOND—Never permit a visible or detected infraction of housekeeping rules to go unnoticed or without comment. Passive tolerance in this regard is as infectious as smallpox and more difficult to cure.

THIRD—Look well to the corners and it will follow as naturally as "the night, the

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day"—the middle of the floor will not suffer for attention.

FOURTH — Distribute rubbish cans with lids and of a standard design, throughout the various departments. Employees cannot be expected to cultivate habits of cleanliness unless means are provided for the disposal of rubbish.

FIFTH—Metallic lockers of an approved type should replace those of wood. Wooden lockers are unsanitary, unsightly, and a constant fire hazard. Their construction is now prohibited in many institutions. Metallic lockers with compartments which extend to the floor and which have sloping tops are preferable to those with flat tops and with open spaces beneath.

SIXTH—The appointment of cross committees is being followed out in many plants with success. The assignment of foreman A to the inspection of Dept. B, and the appointment of foreman B to the Dept. C or D or E, etc., never fail to bring results. The irregularities thus recorded should not be erased or filed until all such items have been corrected.

SEVENTH—An indispensable implement is a substantial grade of mill broom. There comes a time in the life of every broom when it has completed it's term of usefulness, after which good results can no longer be expected from that particular broom. Whenever practical and especially in dusty departments vacuum cleaning systems are also worthy of serious consideration.

EIGHTH — The habitual transgressor may require special attention, but harsh measures should rarely, if ever, become necessary. "As the twig is bent so the tree is inclined."

NINTH — Cultivate this "housekeeping complex" to such a degree that the sense of intuition will permit no irregularity to escape the eye.

TENTH—The last and best suggestion is exactly the same as the first. Read it again.

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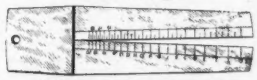

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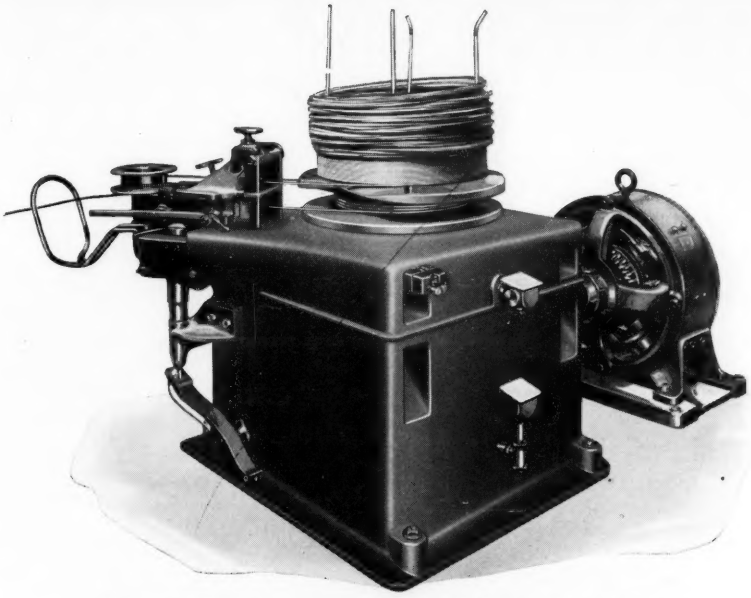

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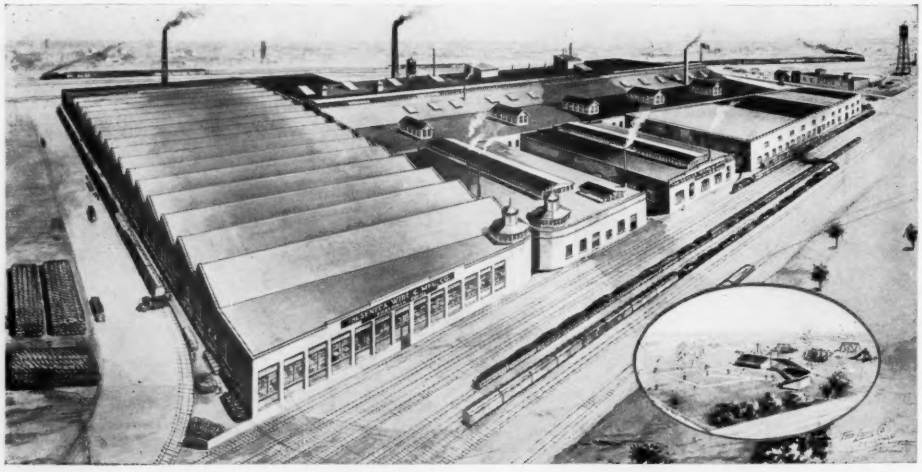

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